Abstract Submitted
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Scaling Exponents for Polymer Translocation through a Nanopore KAIFU LUO, TAPIO ALA-NISSILA, Helsinki University of Technology, PAWEL POMORSKI, MIKKO KARTTUNEN, University of Western Ontario, SEE-CHEN YING, Brown University, ANIKET BHATTACHARYA, University of Central Florida — We present results of extensive computer simulations and scaling theory for computing the relevant scaling exponents associated with polymer translocation through a nanopore [1]. We present results for the scaling of the average translocation time and the fluctuation in the reaction coordinate for the case of spontaneous and field-driven translocation in 2D and 3D. The models used include: (i) the fluctuating bond model with single-segment Monte Carlo moves, (ii) Langevin dynamics, and (iii) GROMACS MD simulations using the bead-spring model for flexible polymers without an explicit solvent. We contrast our results to the recently presented alternate theories for polymer translocation [2,3].

1. K. Luo *et al.*, J. Chem. Phys. **124**, 034714 (2006); **124**, 114704 (2006); **126**, 145101 (2007); Phys. Rev. Lett. **99**, 148102 (2007); I. Huopaniemi *et al.*, J. Chem. Phys. **125**, 124901 (2006); Phys. Rev. E **75**, 061912 (2007); K. Luo *et al.*, e-print arXiv:0709.4615.
2. J. K. Wolterink *et al.*, Phys. Rev. Lett. **96**, 208301 (2006); D. Panja *et al.*, J. Phys.: Condens. Matter **19**, 432202 (2007).
3. J. L. A. Dubbeldam *et al.*, Europhys. Lett. **79**, 18002 (2007); Phys. Rev. E **76**, 010801 (2007).

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